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10/085,935	03/01/2002	Takanobu Takeda	KOJIM-448	4343
23599	7590	12/14/2004	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C.			LEE, SIN J	
2200 CLARENDON BLVD.				
SUITE 1400			ART UNIT	PAPER NUMBER
ARLINGTON, VA 22201			1752	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/085,935

Applicant(s)

TAKEDA ET AL.

Examiner

Sin J. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 and 15-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15, 17, 18 and 20-35 is/are rejected.
- 7) ☒ Claim(s) 2-4, 16 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. Applicants canceled claims 14 and 36.
2. In view of the amendment of September 20, 2004, previous 102(e) rejection on claims 1, 13, 14, 31, and 36 over Zhdanov et al (SU'140) are hereby withdrawn.
3. Due to newly cited prior arts, the following rejections are made *non-final*. *The Examiner sincerely apologizes for any inconvenience caused by this.*

### ***Claim Objections***

4. Claims 2-4 are objected to because of the following informalities: In claim 2, line 2, applicants need to change "(1), (2) and (3):" to --- (1) and (2), and further comprising recurring units of the general formula (3): ---. In claim 3, line 2, applicants need to change "(1), (2) and (4):" to --- (1) and (2), and further comprising recurring units of the general formula (4): ---. In claim 4, applicants need to change "(1), (2) and (5):" to --- (1) and (2), and further comprising recurring units of the general formula (5): ---.  
Appropriate correction is required.

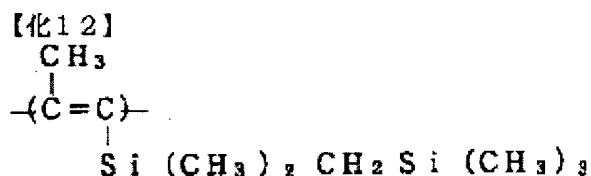
### ***Claim Rejections - 35 USC § 102***

5. Claims 1, 5, 6, 9-11, 13, 22, 23, and 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Kodachi et al (JP 07036188 and its DERWENT English abstract).

The Japanese document has been submitted for full English translation. Only Derwent English abstract is available at this time. Kodachi teaches a positive type photosensitive resist composition comprising a photoacid generator and a resin of formula (I) (which is shown on the first page of the Japanese document) in which R<sup>2</sup> can

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represent an alkyl group having at least one Si. One of the examples for the resin of formula (I) is shown below (see the Japanese document on pg.6, left-hand column, lines 30-40);



Therefore, Kodachi teaches present inventions of claims 1, 5, 6, 13, 31, and 32.

According to PTO's on-site oral English translation of [0015]-[0017] of the Japanese document, Kodachi coats a novolac resist on a Si-wafer as an underlayer resist and then spin-coats his photoresist composition onto the novolac underlayer resist. Then, Kodachi pre-bakes it, exposes it to KrF excimer laser, and develops it to obtain a resist pattern. After that, the underlayer is dry-etched using O<sub>2</sub> RIE. Therefore, the prior art teaches present inventions of claims 9-11, 22, 23, 33, and 34.

6. Claims 1, 5, 9-11, 13, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al (JP 61105542 and its Chem. Abstract).

The Japanese document has been submitted for full English translation. Only the Chem. Abstract (in English) is available at this time. Tanaka teaches (see chem. abstract) a polymer obtained from (CH<sub>3</sub>)<sub>3</sub>-Si-CH<sub>2</sub>-Si(CH<sub>3</sub>)<sub>2</sub>-CH=CH-CH<sub>3</sub>. The repeat unit formed from this monomer teaches present recurring unit of formula (1) of claim 1 and formula (1)-6 of claim 13 because the monomer contains the moiety CH<sub>3</sub>-Si-CH<sub>2</sub>- (which is a silicon-containing group attached to the silicon atom through a silalkylene linkage). Tanaka's polymer is used in a double layer photoresist for fine pattern

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formation. Tanaka coats his Si wafer with AZ1350 (a novolac type resist) and then with a photoresist composition containing his polymer. Then, Tanaka pre-bakes the coated wafer, patterns it by exposure to far UV and by development, and then etches the lower polymer layer by oxygen plasma etching using the photoresist pattern as a mask. Thus, Tanaka teaches present inventions of claims 1, 5, 9-11, 13, and 31.

7. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Saigo (JP 01101312 and its Chem. Abstract).

The Japanese document has been submitted for full English translation. Only the Chem. Abstract (in English) is available at this time. Saigo teaches a homopolymer of  $\text{CH}_2=\text{CH}-\text{Si}(\text{CH}_3)_2-\text{CH}_2-\text{CH}_2-\text{Si}(\text{CH}_3)_2-\text{CH}_2-\text{CH}=\text{CH}_2$ . Saigo uses the polymer in a resist composition for patterning processes together with 2,6-di(4-azobenzal)-4-methylcyclohexanone (a photocrosslinking agent). The repeat unit formed from the above monomer teaches present formula (1) of claim 1; present  $\text{R}^5$  and  $\text{R}^6$  would be methyl groups and present  $\text{R}^4$  would be  $\text{CH}_2-\text{CH}_2-\text{Si}(\text{CH}_3)_2-\text{CH}_2-\text{CH}=\text{CH}_2$  (which is a silicon-containing group attached to the silicon atom through a silalkylene linkage). Thus, Saigo teaches present inventions of claims 1 and 5.

8. Claims 3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Kong et al ("Preparation of Polyacrylate-Polysiloxane Core-Shell Latex Particles", *Polymers for Advanced Technologies*, vol.7(12) (1996), pg.888-890 and its Chem. Abstract).

Kong et al teaches a polymer which contains repeat units formed from an ethenylheptamethylcyclotetrasiloxane, n-butyl acrylate, and a methacrylic acid (see the chem. abstract for the structures of these monomers). The repeat unit from the first

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monomer teaches present formula (2) of claims 3 and 4 (present  $n = 3$ ); the repeat unit from the n-butyl acrylate teaches present formula (4) of claim 3 (present  $Y^1, Y^2$ , and  $Y^3$  being H atoms and present  $Y^4$  being n-butoxycarbonyl group (an alkoxycarbonyl group); and the repeat unit from the last monomer teaches present formula (5) of claim 4 with present  $R^{13}$  being an adhesive group (see pg.17 of present specification). Therefore, Kong's polymer teaches present inventions of claims 3 and 4. Also, it is the Examiner's position that Kong's polymer would inherently be capable of being used as a resist composition. Therefore, Kong also teaches present invention of claim 5 (*present claim 5 does not require the presence of a photoacid generator*).

9. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by Khananashvili et al (Chem. Abstract for "Synthesis of 1-vinyl-1,5,5-trimethyl-3,3,7,7-tetraphenylcyclotetrasiloxane and polymers based on it", Izvestiya Akademii Nauk Gruzii, Seriya Khimicheskaya, vol.17(1) (1991), pg.23-26.).

As shown from the chem. abstract, Khananashvili teaches a homopolymer of 2-ethenyl-2,6,6-trimethyl-4,4,8,8-tetraphenylcyclotetrasiloxane (the repeat unit formed from this monomer teaches present repeat unit (2) of claim 5), and it is the Examiner's position that this polymer would inherently be capable of being used as a resist composition. Thus, the prior art teaches present invention of claim 5 (*present claim 5 does not require the presence of a photoacid generator*).

10. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by Sutyagin et al (Chem. Abstract for "Thermal and Radiation-Induced Degradation of Polysiloxane

Layers Produced by an Electron-Beam Method", Khimiya Vysokikh Energii, vol.11(5) (1977), pg.308-12).

Sutyagin teaches (see the chem. abstract) a homopolymer of ethenylheptamethylcyclotetrasiloxane (the repeat unit formed from this monomer teaches present repeat unit (2) of claim 5), and it is the Examiner's position that this polymer would inherently be capable of being used as a resist composition. Thus, the prior art teaches present invention of claim 5 (*present claim 5 does not require the presence of a photoacid generator*).

11. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by Kaufman et al (Chem. Abstract for "Polyorganosiloxanes Containing Methylvinylsiloxane Links", U.S.S.R. SU 504804 19760228 From: Otkrytiya, Izobret., Prom. Obratzys, Tovarnye Znaki vol.53(8) (1976), pg.63).

Kaufman teaches (see the chem. abstract) a homopolymer of 2-ethenyl-2,4,6-trimethyl-4,6-diphenylcyclotrisiloxane (the repeat unit formed from this monomer teaches present repeat unit (2) of claim 5), and it is the Examiner's position that this polymer would inherently be capable of being used as a resist composition. Thus, the prior art teaches present invention of claim 5 (*present claim 5 does not require the presence of a photoacid generator*).

12. Claims 17 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiang et al ("A Novel Silicon-Containing Copolymer for a Resist Highly Etching-Resistant to Oxygen Plasma", Angewandte Makromolekulare Chemie, vol.209 (1993), pg.25-32 and its Chem. Abstract) (with Osawa et al (5,880,169) which is being cited

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here to support the Examiner's assertion that diazonaphthoquinone sulfonate is a photoacid generator).

Chiang teaches a copolymer made from ethenyltrimethylsilane ( $\text{CH}_3\text{-Si-CH=CH}_2$ ) and 1H-pyrrolie-2,5-dione (see the second page of the chem. abstract). Chiang's polymer teaches present Polymer B of claim 17. Also, Chiang states that his copolymer is used to obtain a *positive photoresist* containing diazonaphthoquinone sulfonate, and the latter compound is a photoacid generator (for the support for the Examiner's assertion that diazonaphthoquinone sulfonate is a photoacid generator, see Osawa, col.13, lines 39-48). Therefore, Chiang teaches present inventions of claims 17 and 21.

13. Claim 17 is rejected under 35 U.S.C. 102(b) as being anticipated by Butler et al (Chem. Abstract for "Copolymerization of Trimethylvinylsilane and Dimethyldivinylsilane with Maleic Anhydride", Journal of Polymer Science, Polymer Chemistry Edition, vol.8(2) (1970), pg.523-32).

Butler teaches a copolymer of trimethylvinylsilane and 2,5-furandione (see the chem. abstract for the structures of both monomers). Thus, the prior art teaches present Polymer A of claim 17.

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

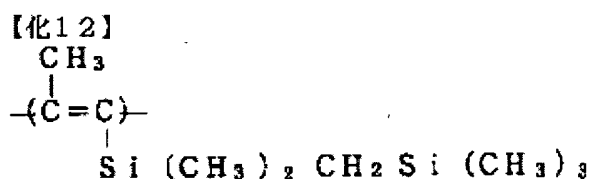
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



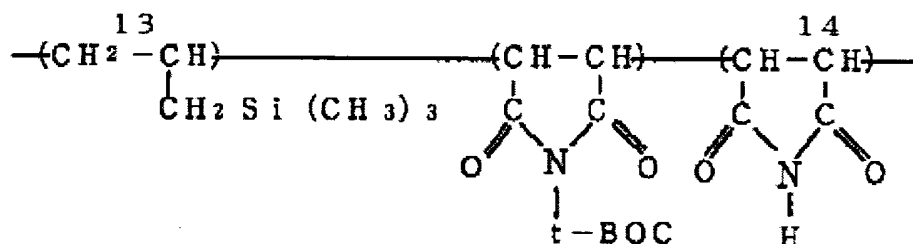
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15. Claims 2, 15, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodachi et al (JP 07036188 and its DERWENT English abstract).

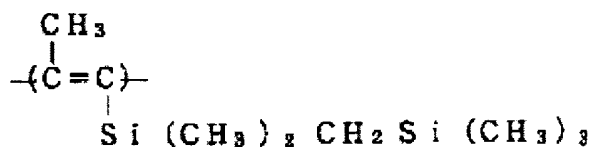
Kodachi is discussed above in Paragraph 5. As explained above, Kodachi teaches a resin of formula (I) in which R<sup>2</sup> can represent an alkyl group having at least one Si, and one of the examples for the resin of formula (I) is shown below;



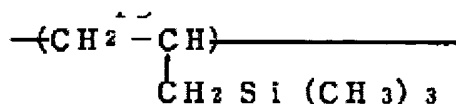
Kodachi also teaches following example of his resin (see pg.8 of the Japanese document);



Since both of

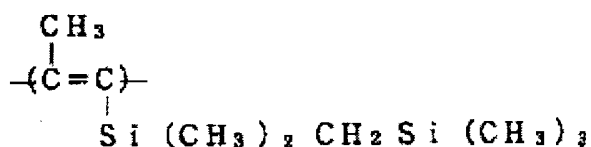


and



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meet the general formula (I), it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to replace the first repeat unit of the polymer shown above (and also shown on pg.8 of the Japanese document) with the repeat unit



with a reasonable expectation of obtaining a Si-containing positive photoresist composition, which is developable by an aqueous alkali developer. Therefore, Kodachi's teaching would render obvious present inventions of claims 2, 15 (the third repeat unit of the polymer teaches present formula (3)-3 of claim 15), and 18.

16. Claims 7, 8, 25, 26, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodachi et al (JP 07036188 and its DERWENT English abstract) in view of Nishi et al (6,048,661).

Kodachi is discussed above in Paragraph 5. As discussed above, Kodachi teaches a positive resist composition containing a photoacid generator and his resin of formula (I). Although the Derwent abstract does not explicitly disclose present dissolution inhibitor or present basic compound, adding such compounds as dissolution inhibitor or basic compound into a positive resist material is well known in the art to enhance the dissolution contrast of a resist film and to increase dissolution rate after exposure to light as evidenced by Nishi, col.2, lines 43-51. Therefore, it would have been obvious to one of ordinary skill in the art to add a dissolution inhibitor and a basic compound to Kodachi's composition in order to enhance the dissolution contrast of the resist film and increase dissolution rate after exposure to light as taught by Nishi. Thus,

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Kodachi in view of Nishi would render obvious present inventions of claims 7, 8, 25, 26, 28, and 29.

17. Claims 12, 24, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodachi et al (JP 07036188 and its DERWENT English abstract) in view of Chao et al (6,162,565).

Kodachi is discussed above in Paragraph 5. Although Kodachi does not explicitly mention the present halogen gas of claims 12, 24, and 35, it is well known in the art, as evidenced by Chao, col.4, lines 51-62, that dry etching is *typically* carried out by a reactive plasma ion etch using a mixture of chlorine and oxygen in the plasma. Therefore, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the mixture of chlorine and oxygen gas in the plasma in performing Kodachi's dry etching step because it is an art-known, typical practice of dry etching. Therefore, Kodachi in view of Chao would render obvious present inventions of claims 12, 24, and 35.

18. Claims 27 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodachi et al (JP 07036188 and its DERWENT English abstract) in view of Nishi et al (6,048,661) as applied to claims 7 and 8 above, and further in view of Chao et al (6,162,565).

Kodachi in view of Nishi is discussed above in Paragraph 16. Although Kodachi does not explicitly mention the present halogen gas of claims 27 and 30, it is well known in the art, as evidenced by Chao, col.4, lines 51-62, that dry etching is *typically* carried out by a reactive plasma ion etch using a mixture of chlorine and oxygen in the plasma.

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Therefore, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the mixture of chlorine and oxygen gas in the plasma in performing Kodachi's dry etching step because it is an art-known, typical practice of dry etching. Therefore, Kodachi in view of Nishi and further in view of Chao would render obvious present inventions of claims 27 and 30.

19. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (JP 61105542 and its Chem. Abstract) in view of Chao et al (6,162,565).

As discussed above in Paragraph 6, Tanaka performs oxygen plasma etching step. Although Tanaka does not explicitly mention the present halogen gas of claim 12, it is well known in the art, as evidenced by Chao, col.4, lines 51-62, that dry etching is *typically* carried out by a reactive plasma ion etch using a mixture of chlorine and oxygen in the plasma. Therefore, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the mixture of chlorine and oxygen gas in the plasma in performing Tanaka's dry etching step because it is an art-known, typical practice of dry etching. Therefore, Tanaka in view of Chao would render obvious present invention of claim 12.

20. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saigo (JP 01101312 and its Chem. Abstract) and Ikeda (6,022,672).

Saigo is discussed above in Paragraph 7. Saigo coats a solution containing his polymer and 2,6-di(4-azidobenzal)-4-methylcyclohexanone (a photocrosslinking agent) on a MP 1300 (a novolac resist)-coated Si substrate, irradiates by UV through a mask, develops, and dry-etches to form a submicron pattern (see the chem. abstract).

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Although the chem. abstract of Saigo does not explicitly teach the present pre-baking step of claim 9, it is *very well* known in the art, as evidenced by Ikeda, col.2, lines 19-26, that the coated resist solution is pre-baked in order to evaporate solvent in the resist coating film for stabilizing resist sensitivity and the residual film rate. Thus, it would have been obvious to one of ordinary skill in the art to perform pre-baking step in Saigo in order to evaporate solvent in his resist coating film and stabilize resist sensitivity and the residual film rate. Therefore, Saigo in view of Ikeda would render obvious present invention of claim 9.

21. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saigo (JP 01101312 and its Chem. Abstract) in view of Ikeda (6,022,672) and Chao et al (6,162,565).

As discussed above in claim 20, Saigo performs dry etching step in order to obtain a submicron pattern. Although the chem. abstract does not explicitly teach what kinds of gases are to be employed for the dry-etching step, it is well known in the art, as evidenced by Chao, col.4, lines 51-62, that dry etching is *typically* carried out by a reactive plasma ion etch using a mixture of chlorine and oxygen in the plasma. Therefore, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the mixture of chlorine and oxygen gas in the plasma in performing Saigo's dry etching step because it is an art-known, typical practice of dry etching. Also, as discussed above in Paragraph 20, Saigo in view of Ikeda would render obvious present pre-baking step of claims 10 and 12. Therefore, Saigo in view of Ikeda and Chao would render obvious present inventions of claims 10-12.

### ***Double Patenting***

22. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

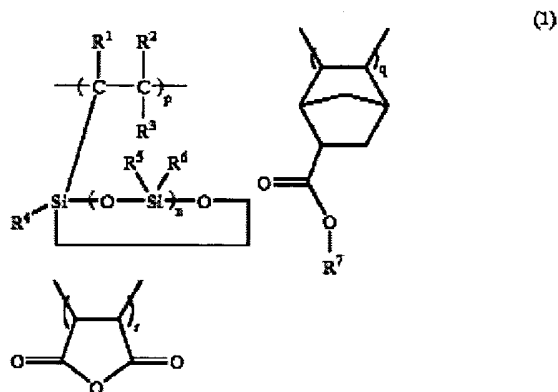
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

23. Claims 1, 2, 5-10, 12, 13, 15, 18, and 22-35 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 and 5-10 of copending Application No. 10/611,014. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Claim 1 of App.'014 states the following;

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1. A silicon-containing polymer comprising recurring units of three components represented by the general formula (1):



wherein  $R^1$ ,  $R^2$  and  $R^3$  are each independently hydrogen or a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms,

$R^4$ ,  $R^5$  and  $R^6$  are each independently hydrogen, an alkyl or haloalkyl group of 1 to 20 carbon atoms, or aryl group of 6 to 20 carbon atoms,

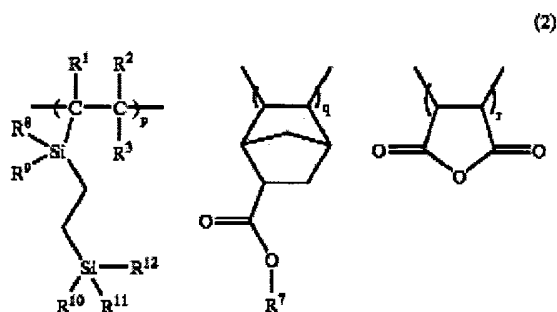
$R^7$  is a straight, branched or cyclic alkyl group of 4 to 20 carbon atoms,

$n$  is a number of 1 to 5,  $p$ ,  $q$  and  $r$  are positive numbers.

Based on the reading of claim 1, it would have been obvious to one of ordinary skill in the art to have the first repeat unit of the polymer shown above in which  $n$  is 4 or 5 (when  $n=4$ , it teaches present recurring unit (2)-3 and when  $n=5$ , it teaches present recurring unit (2)-4) with a reasonable expectation of obtaining the silicon-containing polymer of claim 1. Therefore, claim 1 of App.'014 renders obvious present inventions of claims 1, 2, 13, and 15 (the claim language of present claim 13 does not require the presence of present recurring unit of formula (1). It only requires that if the silicon-containing polymer comprises recurring unit of the formula (1), then the recurring unit of formula (a) has to be chosen from those listed in present claim 13. Thus, claim 1 of App.'014 still teaches present invention of claim 13).

Claim 2 of App.'014 states the following;

2. A silicon-containing polymer comprising recurring units of three components represented by the general formula (2);



wherein  $R^1$ ,  $R^2$  and  $R^3$  are each independently hydrogen or a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms,

$R^8$  to  $R^{12}$  are each independently hydrogen, an alkyl or haloalkyl group of 1 to 20 carbon atoms, an aryl group of 6 to 20 carbon atoms or a silicon-containing group which forms a siloxane or silalkylene linkage to the silicon atom in the formula,

$R^7$  is a straight, branched or cyclic alkyl group of 4 to 20 carbon atoms,

$p$ ,  $q$  and  $r$  are positive numbers.

The first repeat unit of the polymer shown above renders obvious present recurring unit of formula (1) because it contains the present silicon-containing group attached to the silicon atom through a silalkylene linkage. Thus, claim 2 of App.'14 renders obvious present inventions of claims 1, 2, 15, and 31.

Claim 3 of App.'014 renders obvious present invention of claim 5. Claim 5 of App.'014 renders obvious present inventions of claims 6, 18, and 32. Claim 6 of App.'014 renders obvious present invention of claim 7, and claim 7 of App.'014 renders obvious present invention of claim 8. Claim 8 of App.'014 renders obvious present inventions of claims 9, 22, 25, 28, and 33. Claim 9 of App.'014 renders obvious present



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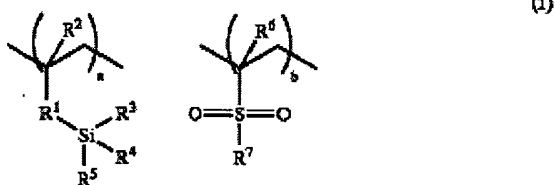
inventions of claims 10, 23, 26, 29, and 34. Claim 10 of App.'014 renders obvious present inventions of claims 12, 24, 27, 30, and 35.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

24. Claims 1, 4-10, 12, 13, 20, and 22-35 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, and 5-13 of copending Application No. 10/611,261. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Claim 1 of App.'261 states the following;

1. A silicon-containing polymer comprising recurring units of the general formula (1):



wherein  $R^1$  is a single bond or a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms,

$R^2$  is hydrogen or a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms,

$R^3$ ,  $R^4$  and  $R^5$  are each independently an alkyl or haloalkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms or a silicon-containing group which forms a siloxane or silalkylene linkage to the silicon atom in the formula,

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$R^6$  is hydrogen, methyl, cyano or  $-\text{C}(=\text{O})\text{OR}^8$ ,

$R^8$  is hydrogen, a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms or an acid labile group,

$R^7$  is a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms,  $-\text{NR}^9\text{R}^{10}$  or  $-\text{OR}^{11}$ ,

$R^9$ ,  $R^{10}$  and  $R^{11}$  are each independently hydrogen or a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms,

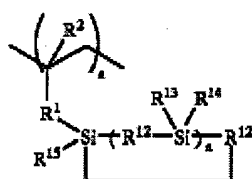
a and b are positive numbers satisfying  $0 < a + b \leq 1$ .

Furthermore, claim 3 of App.'261 states that in the recurring unit "a" of the polymer shown above, at least one of  $R^3$ - $R^5$  is a silicon-containing group which forms a silalkylene linkage to the silicon atom. Therefore, claims 1 and 3 of App.'261 would render obvious present polymer of claim 1 (in the recurring unit "a" of the polymer of claim 1 of App.'261, it would have been obvious to one of ordinary skill in the art to have the  $R^1$  to be a single bond with a reasonable expectation of obtaining a silicon-containing polymer of claim 1). Also, it is the Examiner's position that based on the teachings of claims 1 and 3 of App.'261, it would have been obvious to one of ordinary skill in the art to have  $R^1$  (of the recurring unit "a" of the polymer) to be a single bond,  $R^3$  and  $R^5$  to be  $-\text{CH}_3$  groups, and  $R^4$  to be trimethylsilylmethylene group ( $-\text{CH}_2-\text{Si}(\text{CH}_3)_3$ ) (which is a silicon-containing group which forms a silalkylene linkage to the silicon atom in the formula) with a reasonable expectation of obtaining the silicon-containing polymer of claim 1. Thus, claims 1 and 3 of App.'261 would render obvious present inventions of claims 1, 13, and 31.

Also, claim 5 of App.'261 states the following;

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5. The polymer of claim 1 wherein the recurring unit "a" in formula (1) has a cyclic structure of the general formula (2):



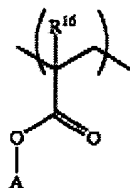
wherein  $R^1$  and  $R^2$  are as defined above,  $R^{12}$  is an oxygen atom, a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms, or an arylene group of 6 to 10 carbon atoms,  $R^{13}$  to  $R^{15}$  are each independently a straight, branched or cyclic alkyl or fluoroalkyl group of 1 to 10 carbon atoms or aryl group, and  $n$  is an integer of 2 to 10.

Since  $n$  can be 4 (which teaches present formula (2)-3) or 5 (which teaches present formulas (2)-4), claim 5 of App.'261 would render obvious present invention of claim 1.

Claim 6 of App.'261 states the following;

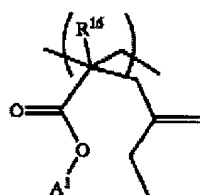
6. The polymer of claim 1 wherein the polymer further comprises recurring units "c" containing acid labile groups in addition to the recurring units "a" and "b" of formula (1), the total of recurring units "a," "b" and "c" being 10 to 100 mol % of the polymer,

the recurring units "c" being selected from the general formulae (C)-1 to (C)-5:

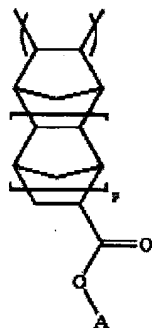


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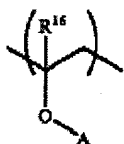
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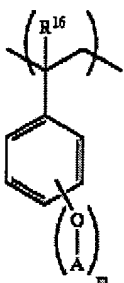
(C)-2



(C)-3



(C)-4



(C)-5

wherein  $R^{16}$  is hydrogen, an alkyl group having 1 to 20 carbon atoms, aryl group having 3 to 20 carbon atoms, haloalkyl group having 1 to 20 carbon atoms or cyano group, A is an acid labile group, p is 0 or 1, m is 1 or

2, both or either one of  $A^1$  and  $A^2$  is an acid labile group,  $A^1$  or  $A^2$  is hydrogen, an alkyl group having 1 to 20 carbon atoms or adhesive group when it is not an acid labile group.

Based on this teaching, it would have been obvious to one of ordinary skill in the art to have the recurring unit "c" of claim 6 to be the recurring unit (C)-1 shown above in which

A is an acid labile group. Therefore, claim 6 of App.'261 would render obvious present invention of claim 4.

Claim 7 of App.'261 renders obvious present invention of claim 5. Claim 8 of App.'261 renders obvious present inventions of claims 6 and 20. Claim 9 of App.'261 renders obvious present inventions of claims 7 and 32. Claim 10 of App.'261 renders obvious present invention of claim 8. Claim 11 of App.'261 renders obvious present inventions of claims 9, 22, 25, 28, and 33. Claim 12 of App.'261 renders obvious present inventions of claims 10, 23, 26, 29, and 34. Claim 13 of App.'261 renders obvious present inventions of claims 12, 24, 27, 30, and 35.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Allowable Subject Matter***

25. Claims 16 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Kong et al (which is discussed above in Paragraph 8) does not teach or suggest present recurring units of claim 16, nor does it teach or suggest present photoacid generator of claim 19.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*S. J. Lee*

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December 6, 2004

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